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The invention relates to a method and devices for handling a request (location request) relating to an address of a switching device (MSC/SGSN), via which a subscriber in a mobile radio network can currently be reached.

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It is known from the document 3GPP 23.271 available at <http://www.3GPP.org> that in response to a location request (request for location-related data, e.g. the location of the mobile radio subscriber) from an LCS client (location services client) to a GMLC (gateway mobile location center) relating to the switching device MSC/SGSN, via which a subscriber in a mobile radio network can currently be reached, the GMLC requests the address of a switching device currently responsible for a subscriber from a home location register (HLR). A GMLC-R5 (version "R5" GMLC or even older version) sends an SRI request (SRI = send routing information, such as for example a MAP destination address, etc.) to a subscriber database (HLR-R4/R5) of the mobile radio network for the address of a switching device (MSC, SGSN, etc. of a subscriber database (VLR) there), via which a subscriber (MS) (characterized by an MSISDN or IMSI, etc.) can currently be reached, whereupon the home location register (HLR/R4/R5) sends back in a response (Ack(SGSN)/Ack(MSC)) data representing the (MAP/ISDN/etc.) address of a switching device (MSC/SGSN) to the location request device (GMLC-R5), which then sends data relating to the location request via an Lg interface to the switching

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device (MSC/SGSN) specified to it by the HLR for further handling there (determination of position of current MS position and/or other services) (Fig. 2).

5 The development of a home GMLC would make it possible (Fig. 3) to transmit the address data of a switching device (MSC/SGSN) or an H-GMLC in the home network of a subscriber in response to a request from a first GMLC (R-GMLC) to a home data base, with the option of being able to verify and
10 take into account privacy data stored there in the H-GMLC relating to privacy functions, etc. Said data is transmitted from the H-GMLC (in so far as this is expedient based on the privacy data of the subscriber) for example to a switching device (MSC/SGSN) in the network visited by the subscriber
15 or a home network for further handling. With this variant however the problem would arise that an older version GMLC (e.g. GMLR-R5) and HLR would not be able to process details of the further GMLC (H-GMLC R6) handling the location request further according to Fig. 3.

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The object of the present invention is to allow the most efficient handling possible of a location request with newer version home registers (e.g. HLR R6) even with an older version GMLC (GMLC-R5). The object is achieved in each
25 instance by the subject matter of the independent Claims.

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As according to the invention, when a request from an older version (release 5) location request handling device (GMLC-R5) is received in a newer version home register (HLR-R6), a response (Ack(MSC and/or SGSN)) is transmitted to the
5 location request handling device (GMLC-R5) in a form which the GMLC-R5 understands such that the address data of a switching device (MSC/SGSN) is specified to it, which it (GMLC-R5) according to Fig. 2 should contact for the further handling of a location request, the GMLC R5 generally
10 contacts the element that can be reached at the address specified in the response of the HLR, which here is not however the MSC/SGSN (as usual) but according to Fig. 1 a newer version location request handling device (H-GMLC R6), which after receiving further data (Ack and in some
15 instances privacy data) from the HLR R6 contacts a switching device (MSC/SGSN/V-GMLC) in Fig. 1 and prompts the further handling of the location request there. The home database (HLR-R6) in Fig. 1 thus sends, in the format of a message, which in the standard manner specifies to an older version
20 location request handling device (GMLC-R5) the switching device address data of an MSC/SGSN (Ack (SGSN and/or MSC) (according to Fig. 2), the address of the H-GMLC-R6 in the address field of the message Ack (...), which prompts the location request handling device (GMLC R5) to contact the
25 further location request handling device (H-GMLC R6) specified. It is thereby not evident to the former location request handling device (GMLC R5) that it is actually

contacting (according to Fig. 2) not a switching device
MSC/SGSN but a further location request handling device H-
GMLC-R6 according to Fig. 1, which (in some instances after
taking into account the privacy profile data of the HLR R6)
5 in turn contacts the switching device MSC/SGSN at the
switching device address, which the H-GMLC-R6 receives in
the message Ack (V-GMLC or MSC or SGSN) from the HLR R6.

Particularly advantageous embodiments will emerge from the
10 subclaims.

It is for example advantageous if, when handling a location
request in a home GMLC (H-GMLC R6) stored profile data
relating to the subscriber in relation to whom a location
request is to be executed, can be taken into account; in
15 particular this may be privacy profile data, which is stored
in relation to a terminal or subscriber or a subscriber
identity card and specifies whether and under what
conditions a position determination operation can be
processed and/or responded to in relation to the subscriber.

20 Further features and advantages of the invention will emerge
from the description which follows of the prior art and an
exemplary embodiment with reference to the drawing, in
which:

25 Fig. 1 shows a schematic diagram of the interaction
according to the invention of components of a mobile radio

network for handling a location request with elements of older and newer versions,

Fig. 2 shows the handling according to the prior art of a location request with an older version GMLC-R5,

Fig. 3 shows the handling of a location request with a newer version HLR-R6 and R-GMLC R6.

10 The handling of a location request already described above according to Fig. 2 is suitable for current standard versions (product versions) of location request handling devices GMLC and subscriber databases (HLR-R5). As described in more detail at the start, possible processing of a location request according to Fig. 3 would be problematic, if there were a GMLC-R5 instead of the R-GMLC-R6 shown in Fig. 3, as this cannot interpret and process data "Ack(H-GMLC)", as shown in Fig. 3, of a further location request handling device H-GMLC-R6.

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Thus according to Fig. 1 a new version home register HLR R6, when it receives a request from a former (older) version location request handling device GMLC-R5, which is awaiting details (Ack-H-GMLC) of address data relating to an address of a switching device (MSC/SGSN etc.) as a response by the subscriber database (HLR) to the request, specifies to the former older version location request handling device GMLC-

- R5 the address of a further location request handling device (H-GMLC-R6) in a data field, in which the address of the switching device would otherwise be specified. A format is thereby used in the details of the location request handling
- 5 device address of the further location request handling device H-GMLC, in which the first location request handling device GMLC-R5 awaits the details (Ack-H-GMLC) of an address of a switching device (MSC/SGSN etc.).
- 10 The GMLC-R5 interprets the address of the switching device (MSC and/or SGSN) specified in this address field (provided for a GMLC address) to the effect that it (GMLC-R5) should contact the switching device specified by this address for further handling of the location request. However according
- 15 to Fig. 1 it thereby contacts the further location request handling device H-GMLC-R6, which (in the manner provided conventionally for it) uses the data thus transmitted to it according to Fig. 2 and the data transmitted to it from the HLR-R6 to handle the location request further, by contacting
- 20 the switching device MSC/SGSN specified to it, in some instances via an Lg+** interface in Fig. 1.

In this way according to the invention older version location request handling devices GMLC-R5 can be operated

25 efficiently with newer version home subscriber databases HLR-R6 and further location request handling devices (new version H-GMLC-R6). It is thereby possible in some instances

to take into account profile data, in particular privacy profile data, relating to the subscriber and stored in a new version location request handling device (H-GMLC-R6). Such privacy data can in particular specify whether location requests can be handled and/or responded to for a subscriber in principle, or as a function of said subscriber's location or as a function of the caller or as a function of other conditions or in another manner; this is thus also possible in conjunction with an older version GMLC-R5.

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This process can for example also operate in response to a request from a subscriber in a cellular mobile radio network, to whom data is transmitted representing the position of a further subscriber in a cellular mobile radio network (in some instances only to the extent permitted by the profile data of the further subscriber). The request is then sent for example from the requesting subscriber in particular via an air interface and switching devices to the LCS client shown in Fig. 1 and from there according to Fig. 1, whereupon data representing the position of a further subscriber in a cellular mobile radio network can be transmitted (e.g. by SMS, MMS, card, etc.) to the requesting subscriber.

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The switching device (MSC/SGSN/V-GMLC), via which (MSC/SGSN/V-GMLC) a subscriber (MS) can currently be reached, can be a switching device such as an MSC/SGSN, via which the subscriber has just telecommunicated or in the

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visitor location register (VLR) of which data about the subscriber is stored, or another device (V-GMLC) via which a subscriber can communicate directly or via other devices. There are a plurality of options for the format of address data, in particular the MAP format (a MAP address is for example a network node number in ISDN format for MSC, SGSN, GMLC). For an interworking scenario, MAP address format is also suitable at the Lg and Lh interface (and in some instances also at Lg+ and Lh+ in Rel-6). An IP address format for address data is for example possible on the Lr interface.

Claims

1. Method for handling a location data request (location request) relating to a subscriber in a mobile radio network, with which on receipt of a request (SRI) from a first location request handling device (GMLC-R5) at a subscriber database (HLR) of a mobile radio network for switching device address data (MAP(MSC/SGSN/V-GMLC)) of a switching device (MSC/SGSN/V-GMLC), via which (MSC/SGSN/V-GMLC) the subscriber (MS) can currently be reached, instead of switching device address data (MAP (MSC/SGSN)) the subscriber database (HLR) specifies to said device (GMLC-R5) in a response (ACK (MSC(SGSN))) location request handling device address data (MAP (H-GMLC)) representing the address (H-HGMLC) of a further location request handling device (H-GMLC-R6), if it is a request (SRI) from a location request handling device (GMLC/R5) of a version (R5), according to which version (R5) there is provision for the location request handling device (GMLC-R5) to receive switching device address data (MAP (MSC/SGSN)) from the subscriber database (HLR) as a response.
2. Method according to Claim 1, characterized in that the further location request handling device (H-GMLC-R6) is a location request handling device in

the home network of the subscriber (MS).

3. Method according to one of the preceding Claims,
characterized in that the further location request handling
5 device (H-GMLC) stores profile data of the subscriber (MS),
in particular privacy profile data, which specifies whether
and under what conditions a location request relating to a
subscriber (MS) should be processed and/or responded to.

10 4. Method according to one of the preceding Claims,
characterized in that the older version location request
handling device (GMLC-R5) sends the request (SRI) to the
subscriber database (HLR) after it (GMLC-R5) receives a
request from an LCS client (LCS client).

15 5. Method according to one of the preceding Claims,
characterized in that the location request handling device
(GMLC-R5) sends a location request to the address (MAP (H-
GMLC)) of a further location request handling device
20 (HGMLC), which (H-GMLC-R6) forwards it to the address of a
switching device (MSC-SGSN), which was specified (Ack) to it
(H-GMLC-R6) by the subscriber database (HLR) in response to
its (H-GMLC-R6) request (SRI) to the subscriber database
(HLR R6).

25 6. Method according to one of the preceding Claims,
characterized in that a location request contains data

(IMSI/MSISDN/etc.) of a subscriber to be located identifying said subscriber (MS).

7. Method according to one of the preceding Claims,
5 characterized in that location request handling device address data has the same format as switching device address data, in particular an ISDN format or MAP data format.
8. Method according to one of the preceding Claims,
10 characterized in that the version of the location request handling device is identified by a subscriber database (HLR) from the non-extended format of the request (SRI).
9. Method according to one of the preceding Claims,
15 characterized in that the version of the location request handling device (GMLC-R5) is identified from the Lh interface used.
10. Method according to one of the preceding Claims,
20 characterized in that in the further location request handling device (H-GMLC-R6) profile data of the subscriber, in respect of whom a location request is to be implemented, is verified and the further location request handling device (H-GMLC-R6) only contacts the switching device (MSC/SGSN)
25 specified to it, if the profile data of the subscriber shows that a location request relating to said subscriber should

be carried out.

11. Device (HLR-R6) to implement the method according to one of the preceding Claims.